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# MODIFICATIONS OF RESPIRATION IN THE INSANE.[1]

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INSANITY is a widely varying manifestation of disease of nerve-centres. It frequently involves disorder of the motor, sensory, and trophic functions of the nervous system, as well as derangement of the mental faculties.

It would be strange indeed, in the midst of the turmoil of disturbances of sensation, motion, digestion, and circulation, which insanity often presents, if the function of respiration alone should remain intact.

The clinical fact is, that modifications of respiration in the insane are frequent, though their systematic description has failed to find its way into the text-books on insanity, so far as the writer is aware.

To facilitate the study of this subject the chief modifications of respiration in the insane have been tabulated.

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[1] Read before the New York Neuorological Society, February 7th, 1893.

## TABLE OF MODIFICATIONS OF RESPIRATION IN THE INSANE.

### GROUP A.

(*a*) Modifications in frequency.
(*b*) " depth.
(*c*) " rhythm.
(*d*) " sound.

### GROUP B.

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| (*a*) Spasmodic expiratory modifications | Laughter, crying, sneezing, coughing, snoring. |
| (*b*) Spasmodic inspiratory modifications | Singultus, chasmus-laryngeal crises. |

### GROUP C.

Dyspnoic modifications.

Brief consideration will now be given to each of the subdivisions in the above arrangement.

In the first place then the frequency of respiration may have an average variation in accordance with the general form of the mental disease. Respiration as a rule is less frequent in complete states of mental depression and more frequent in fully developed states of mental exaltation.

In melancholia attonita it will sometimes sink as low as eight per minute, while in acute mania it may range as high as thirty, and in delirium acutum, and in certain epileptic and paretic maniacal exacerbations, it may even attain the rate of forty or fifty per minute.

In certain cases of terminal dementia with capillary stasis, in low forms of imbecility and cretinism and in idiocy there is often found a greatly diminished frequency of respiration.

Occasionally there is a well marked diurnal variation in frequency of respiration, which attains its maximum in the evening hours in phthisical and paretic insanity.

In organic dementia with gross brain lesions the respiration for brief periods may sink to the infrequent limits of from five to ten per minute and this is also the case in cataleptic and ecstatic states.

The depth of the respiratory movements in the insane is likewise subject to modifications.

In pronounced melancholic states the inertia of the muscular extensor-groups extends in a measure to the respiratory muscles, and the respiration often becomes superficial, and contrasts strongly with the full breathing in maniacal conditions.

There is the same lack of full depth of respiration also in some stuporous forms of mental disease, and in numerous cases of dementia with vaso-motor paresis, blueish skin, cold extremities and feeble cardiac action.

Superficial respiration again is found in precordial panic, and in the final stages of maniacal exhaustion, in which it is one of the early prognostic signs of a fatal termination.

There is also the diminished depth of breathing from paralysis of respiratory muscles on one side in cases of dementia following hemiplegia, and in cases of malarial insanity with pleurodynia and intercostal neuralgia.

The insane also under the influence of delusions may in some degree for considerable periods of time voluntarily inhibit complete respiration just as on the other hand breathing may become deeper than usual from the violent and uncontrollable emotions to which they are all so subject.

In some cases of acute mania with great motor excitement and accelerated pulse rate there is a corresponding increase in the extent of the respiratory movements, and one of the protean manifestations in hysterical mania consists in a most exaggerated depth of respiration continuing for hours at a time.

The modifications of respiration in rhythm are not so often met with as those in depth and frequency but they are the more interesting on that account.

In insanity from gross brain disease, in feeble cases of senile dementia, and in general paresis there is sometimes found a considerable prolongation of expiration, while in hysterical mania there is to be witnessed at times a decided lengthening of inspiration or in other cases a shortening of both expiration and inspiration, and an undue pause between the respiratory acts. There is furthermore among the insane occasionally either from powerful emotions or delusions a respiration voluntarily forced for a brief period followed by a pause, and then comes another sequence of exaggeration and suspension of breathing.

In hysterical insanity also there is in rare instances a remarkable rhythmical variation which consists in an exaggeration of all the respiratory movements for a few moments followed by a state of quiescence or actual apnœa, which is succeeded again by the increased breathing. These symptoms are quite distinct from the Cheyne-Stokes respiration, which although very exceptional in hysterical insanity, has, in the writer's observation, been several times present during the convulsive seizures of general paresis.

Something of the nature of Cheyne-Stokes respiration is also an occasional phenomon in the "status epilepticus," and in the final stage of delirium acutum among the insane. There is also in cataleptoid states an alternation of light and deep breathing with undue pauses between expiration and inspiration. In fully developed trance there may be for brief periods, apparently complete suspension of respiration.

The most constant rhythmical variation during the sleep of the insane is the prolongation of expiration, and a change in the actual number of the respiratory acts. It is also to be here noted, that the insane are especially subject to incubus, which is accompanied by decided changes in the rhythm of respiration.

Voluntary prolongation of expiration and other rhythmical changes are brought about by the shouting, singing and whistling of maniacs. These forced expiratory acts, continued without intermission, as they sometimes are, over long periods, may prevent the venous blood return from the brain and cause both pulmonary and cerebral congestions, chronic laryngeal troubles, and such other untoward symptoms as are found among singers, public speakers, and players on wind instruments. It is interesting to observe in these shouting cases of acute mania, when exhaustion sets in, and feebleness and hoarseness prevent an audible articulation, the respiration still continues modified in the direction of prolonged expiration from the shere automatic force of recent habit.

Modifications of sound in the respiration of the insane are comparatively rare, one of the most common of these is to be heard only on auscultation and is likely dependent on some inequality of the innervation of the respiratory muscles. It consists in an unevenness or full interruption in the passage of air into or out of the lungs. The inspiratory interruption however is more common than the expiratory, and is to be found independently of any lung disease. It is seen in its most extreme form in hysterical and paretic cases. Passing over various spasmodic and congestive states of the respiratory organs especially common in mental diseases, and which modify respiratory sounds, attention is invited to the voluntary modification of sounds in respiration due chiefly to emotional and delusional influences. Thus some patients for hours at a time will render both expiration and inspiration audible, and although sitting or recumbent will give forth a panting respiration as if from an excess of muscular effort.

The character of the modified breathing in this instance is imparted by the contraction of pharyngeal and laryngeal muscles, and the resulting sound is essentially of a throaty nature. This modification differs from the wheezing and dry rales often heard in the respiration of idiots, and senile dements in whom these sounds are exclusively formed in the bronchial tubes. Finally under this head is to be mentioned the sighing respiration of cerebral anæmia and hyperæmia of the insane, and in the various convulsive seizures to which they are specially liable.

The spasmodic modifications of respiration have been divided into an expiratory and an inspiratory group on the ground of objective symptoms rather than of any true pathological difference. The first modification to be considered in the expiratory group is laughter, which consists in prolonged expiration with explosive interruptions, and reflex action chiefly of muscles in the facial region, but also extending at times to abdominal and other muscles.

There is no more interesting or startling phenomenon in the whole range of neurological symptomatology than the automatic laughter of the insane. The writer has seen patients for hours at a time a prey to this form of reflex convulsive action, which was as effectually beyond voluntary control as any other form of convulsive seizure. Not only is the laughter involuntary, but it is in some cases completely severed from any pleasing emotion, and may be positively painful. It may begin as an emotional reflex, partly under voluntary control, and be continued until it completely escapes all power of the will, and this is more frequently the case, or it may from the very first be of a purely automatic character and even contrary to the dominant feelings.

This spasmodic modification of respiration is most common in hysterical, epileptic, and paretic insanity, though it may be found in any of the acute forms with active pathological changes in encephalic centres, and the pathology of the symptom is to be sought more especially in intense irritation of cortical regions.

One of the most remarkable instances of this affection within the writer's observation was that of a young male epileptic dement subject to occasional cataleptoid conditions and maniacal exacerbations. The laughter in his case was automatic and prolonged for hours, and so loud and disturbing to others that isolation was necessary, and it finally left the patient in much the same state as a severe epileptic seizure of which in all probability it was vicarious in this case.

Another interesting feature of laughter, in mental diseases, is that it is sometimes severed from the facial muscular contractions, which usually accompany it, and has a heightened secretory reflex of tears, so that the striking spectacle is presented of laughter without the expression of hilarity and with lachrymation. This is the explanation of the fact, that it is sometimes difficult to distinguish between laughing and crying in some cases of mental disease. The insane now and then make unnatural efforts to suppress laughter, and then burst out into some strangely explosive sounds, or manifest various painful modifications of respiration in their forced attempts to avoid audible laughter.

Crying like laughter in the insane may become continuous and automatic. It may occur in the absence of distressing emotions. It is often, though not always, accompanied by the ordinary change of physiognomy, but tears frequently fail to appear. The attacks of hysterical maniacs, during which there is violent spasmodic action of the vocal and expiratory muscles, furnish extreme forms of crying partly voluntary or wholly involuntary.

The writer has had a case of insanity with one sided spasm of face and neck accompanied by a sudden involuntary outcry. This spasmodic modification of respiration occurred in this case every few moments of the day. It might be well to mention in this connection also the loud and frequent eructations from which some insane patients suffer for long periods of time, and which in some degree modify respiration. These eructations are not infrequently due to gas formed in the gastro-intestinal canal, but when the belching is loud and constant it is more apt to be the immediate result of the habit of swallowing air.

In cases of hysterical insanity with gastric tympanitis, and diaphragmatic spasm another rare form of eructation is heard as the air is suddenly forced from the stomach through the œsophagus.

Sneezing furnishes another type of spasmodically modified respiration. It is ordinarily caused by excitation of the nasal distribution of the fifth nerve, but it may arise through the most varied reflex channels from irritations of a peripheral nature. It is to be observed most frequently in hypochondriacal and hysterical cases, and in those complicated with disorder of the reproductive organs. In one case walking over snow or sand uniformly caused sternutatio convulsiva, and, a similar reflex spasm may arise through optic channels from the sight of bright objects or colors. Sneezing is especially troublesome from its recurrent and continous nature and it may be present for days at a time. In certain cases it seems to be an acquired habit recurring with rhythmical regularity much like a spasmodic tic. One of these chronic sneezing cases in a ward, through imitative contagion, gives rise to others, who thus come to cultivate rather than to inhibit, every tendency to sneeze.

Cough as a spasmodic respiratory modification presents several points of practical interest. In the first place the pharyngeal and laryngeal anæsthesia of mental disease not infrequently excludes cough from the category of objective signs even in the most severe cases of lung disease. Thus has the writer seen walking cases of pneumonia and phthisis pulmonalis in all its stages without any cough whatever.

On the other hand a dry rasping chronic cough, without any organic pulmonary change, is a common symptom in insane women, as a reflex of uterine disorder, though it also exists independently of any disorder of reproductive organs both in men and women. There is again the barking cough of choreic and hysterical insanity, loud and oft-repeated, and accompanied by spasmodic movements. There are also among the insane modifications of this barking cough, which imitate more or less nearly the sounds of various animals. These strange sounds involuntarily made by spasm of the laryngeal and expiratory muscles furnish the explanation of some of those cases of lycanthropy, described by ancient writers as making noises like dogs and wolves. Prolonged cough is in some cases of mental disease a serious complication causing venous hyperæmia of the brain, and thus interfering with the nutrition of an organ, which is already the weak spot in the organization.

It is of interest to know, that in some hypochondriacal cases of insanity, cough is purely the result of delusion.

Space will only permit an allusion to the suffocative cough of the bedridden stage of organic dementia, and of the sudden spasmodic seizures of cough, which form in exceptional instances one of the earliest symptoms in general paresis.

Attention is next invited to respiratory modifications in the insane during sleep. These are favored by the rhythmical reductions of organic functions during sleep, by lessened excitability of the medullary respiratory centre—by diminished oxidation,—and by an almost complete suspension of cerebral inhibition.

Thus it frequently happens that the insane, exhausted by the motor and emotional excitement of the waking hours, sink into a profound sleep, which borders on a pathological condition. The respiration becomes deep and labored—the expiration is prolonged—through inadequate innervation of the temporal and masseter muscles, the lower jaw drops, and mouth breathing and its attendant evils are superadded. The sounds, which modify respiration in this deep sleep are well worthy of clinical study. In the first place then let a word be said about snoring.

It is chiefly the expiratory current of air, though sometimes also the inspiratory, which throws the uvula and velum pendulum palati into vibrations, which, modified variously by the oral and nasal cavities, constitute the different kinds of snoring.

There is also another sound made during expiration by the vibration of the lips, which usually indicates a very profound sleep. In extreme exhaustion from mania, there may be added to this labial vibration the blowing and puffing out of the cheeks. The sleep of general paretics in the dorsal decubitus from prolapse of the palate, and the falling back of the base of the tongue, gives still different and sometimes alarming obstructive forms of breathing.

There is in some of these cases interference of breathing from collapse of the alæ upon the septum nasié with the formation of more or less noisy inspiration.

The vocal chords themselves, in rare instances, not only furnish the obstruction to respiration, but also by their vibration, either in expiration or inspiration, cause a variety of sounds.

To sum up in a word, then, there are labial, nasal, oral, palatal, pharyngeal and laryngeal obstructions and sound-modifications of the respiration of the insane, who, with exhausted nerve-centre, fall into a sleep which is often of the nature of true sopor.

Even positive stertor is often encountered during the sleep of alcoholic, epileptic, paretic, and post-hemiplegic cases of insanity.

In the respiratory disorders which have been described, the prominent modifications have been in expiration, but there are others now to be noticed in which the spasmodic phenomena are more especially to be witnessed in inspiration.

Singultus, which comes first, in this inspiratory group, is a very common and distressing symptom in insanity. It consists, as is well known, in diaphragmatic spasm causing a sudden inspiratory current of air, which is interrupted by a characteristic noise from abrupt closure of the glottis.

This glottic closure may at first be simply due to sudden atmospheric pressure upon the vocal chords, but in prolonged cases it ordinarily becomes spasmodic. It is of clinical importance to know that it may not be present at all, as the essential part of the disorder is the spasm of the diaphragm.

Perverted appetite, disordered digestion, and gastric flatulence, so constant in the insane, are the common causes of hiccough, which may spring also from a great variety of reflex sources, such as irritations of abdominal organs, and diaphragmatic pericarditic, or intestinal inflammations. The most direct etiology of singultus is irritation of the phrenic nerve. In tabetic and paretic cases, the pathology of singultus is probably irritation of the roots of the phrenic nerves from the cervical spinal lesions. It is not easy to offer a rational explanation of singultus, which is so often present in insanity with cerebral lesions far removed from the respiratory centre. In one instance, under the writer's observation, hiccough was almost constant for several days, and a post mortem examination revealed partial thrombotic occlusion of the basilar artery.

Singultus is to be observed also in anemic, malarial and toxic cases of insanity; and it may be that the cause, in these instances, is poisoned blood supply and irritation of the respiratory centre. In hysterical and hypochondriacal cases, singultus exists in a continued and most troublesome form, and the pathology of these cases is imperfectly understood. In fact, this spasmodic modification of respiration in some of these cases becomes chronic, and constitutes in itself a species of neurosis.

Oscedo, or yawning, is another respiratory modification, which is not without considerable interest in mental diseases. It consists in a gradual, audible, and deep inspiration, with open mouth and with general action of the extensor muscles of the trunk and limbs, followed by a prolonged expiration, which is also often attended by characteristic vocal sounds.

There is also, at times during this act, an increased flow from lachrymal and salivary glands, and hissing or clicking in the ears. In paralytic cases there may be witnessed during this spasmodic act certain tremors, and partial or complete contraction of muscles, which are entirely beyond the control of the will.

Long-continued yawning is most common in hysterical, hypochondriacal, epileptic, and paretic cases, in which it not infrequently passes beyond voluntary control. Thus, in hysterical insanity, chasmus hystericus may be as completely beyond control as globus hystericus, or any of the rest of the spasmodic phenomena, and it may continue for days at a time.

Oscedo, sometimes, becomes a chronic habit; and it is true, also, that there is a contagion by example, in regard to this affection among the insane.

Sobbing is another respiratory modification, which is a common means of expression of the painful emotions to which the insane are so constantly subject. It takes the place of crying often in mental diseases, and is a spasmodic, noisy interruption of inspiration. It is ordinarily somewhat within the control of the will, but when it has long persisted it becomes, not only completely spasmodic, but very difficult to arrest except by the most powerful sedatives.

During these sobbing seizures, the diaphragm may act so violently as to expel gas from the primæ viæ per annum or per oram, and cerebral anæmia and pulmonary congestion with mucous rales may become epiphenomena of this spasmodic affection, which, if allowed its full course, may continue until the patient sinks exhausted into a soporific state.

Finally, in this inspiratory group are to be classed changes in breathing due to laryngeal spasmodic affections, which are most common in mental diseases with organic lesions of brain or spine. In tabetic cases is sometimes found imperfect action of the abductors of the vocal cords and difficulty of inspiration, and in general paresis from central sclerotic changes and irritation of the laryngeal branches of the pneumogastric, spring noisy and labored inspiration.

In one case of general paresis under the writer's care, this suddenly recurring spasmodic difficulty of inspiration was one of the very first symptoms antedating the disturbances of speech, gait, and pupillary reflexes, at least a whole year.

There are, also, in what are known as ascending cases of general paresis, laryngeal crises corresponding essentially to those found in locomotor ataxia.

In concluding this subject there remain to be mentioned dyspnœic modifications of respiration, which, of frequent occurrence, are of obscure pathology.

In hysterical insanity, feelings of suffocation and most distressing dyspnœa are exhibited for hours at a time. In hypochondriacal insanity there is a similar dyspnœa, and so painfully conscious does the patient become of his respiratory acts, that every breath is a labor.

In alcoholic and paretic cases of mental disease severe attacks of dyspnœa are occasional symptoms, and are, perhaps, due to medullary lesions in the neighborhood of the respiratory centre.

There are, also in these forms of insanity seizures of dyspnœa, in connection with cardiac crises, which even continue to the point of syncope.

The respiratory modifications which attend acute and chronic diseases of the thoracic and abdominal organs, diathetic states, and intercurrent diseases in general have been purposely omitted from the brief limits of this paper, and may at some future time be described in a separate article.

The object on the present occasion has been to sketch the chief modifications of respiration arising from the functional or organic disorders of nerve-centres so constantly present in the insane, and to briefly present to my hearers an interesting subject of neurological study, which seems in a great measure to have escaped the attention of writers on mental diseases.

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***Treatment of Chorea.***—According to the "Gazette de Paris," Juin 18, 1892, Baumel considers anæmia the predisposing cause of chorea. Its chief exciting cause is the work of detention, principally the large molars that appear between the age of six and fourteen years. The author recommends two grammes of bromide of potassium in thirty grammes of syrup of orange peel and ninety grammes of water, to be divided into three or four doses and taken within twenty-four hours; and five centigrammes of reduced iron during breakfast and supper, together with twenty grammes of extract of quinquina in a glass of sweetened milk night and morning. L. F. B.